

Science Bowl Questions 1994

Round 10

Toss-Up

1. GENR; Short Answer: Who was the first woman to fly solo across the Atlantic?

ANSWER: AMELIA EARHART

Bonus

1. GENR; Short Answer: What science fiction writer played a part in the development of radar?

ANSWER: (ARTHUR) C. CLARKE

Toss-Up

2. PHYS; Multiple Choice: If the angular momentum of a system is constant, which of the following statements must be true?
 - a) no torque acts on any part of the system
 - b) zero net torque acts on each part of the system
 - c) a constant external torque acts on the system
 - d) zero net torque acts on the system

ANSWER: D – ZERO NET TORQUE ACTS ON THE SYSTEM

Bonus

2. PHYS; Multiple Choice: What is the term for the fraction of light or other electromagnetic energy reflected by a surface such as snow or ice?
 - a) transmittance
 - b) albedo
 - c) reflection
 - d) emissivity

ANSWER: B – ALBEDO

Toss-Up

3. BIOL; Multiple Choice: Identify the bond between the nitrogen base and the sugar in DNA.
- a) hydrogen
 - b) ionic
 - c) phosphodiester
 - d) glycosidic

ANSWER: D - GLYCOSIDIC

Bonus

3. BIOL; Short Answer: Which hypothesis best helps to explain why several amino acids are coded by more than one codon?

ANSWER: THE WOBBLE EFFECT (ACCEPT WOBBLE)

Toss-Up

4. ASTR; Short Answer: The earth's atmosphere consists primarily of nitrogen. What is the primary constituent of Venus' atmosphere?

ANSWER: CARBON DIOXIDE

Bonus

4. ASTR; Short Answer: For what purpose are the constellation stars, Vega and Altair, most commonly used?

ANSWER: (CELESTIAL) NAVIGATION

Toss-Up

5. CHEM; Short Answer: what is the primary constituent of marble?

ANSWER: CALCIUM CARBONATE

Bonus

5. CHEM; Short Answer: What property of an orbital does the azimuthal quantum number determine?

ANSWER: SHAPE (OF AN ORBITAL)

Toss-Up

6. COMP; Short Answer: You have just written a computer program, and you must apply the following 4 operations to it: Load, link, execute, and compile. In what order would you most likely apply the 4 operations?

ANSWER: COMPILE, LINK, LOAD, EXECUTE

Bonus

6. COMP; Short Answer: Your Pascal program is now running successfully on your computer. What is the name of the data structure where the computer is storing your local variables?

ANSWER: IN THE RUN-TIME STACK (EXECUTION STACK IS ALSO ACCEPTABLE)

Toss-Up

7. BIOL; Multiple Choice: Where are the membrane structures, Mesosomes, found?

- a) eukaryotes
- b) prokaryotes
- c) liver cells
- d) fungi

ANSWER: B – PROKARYOTES

Bonus

7. BIOL; Short Answer: Identify the amino acid that forms disulfide bonds in a protein.

ANSWER: CYSTEINE

Toss-Up

8. PHYS; Multiple Choice: Identify the amino acid that forms disulfide bonds in a protein.

- a) the tangential velocity of the tip is constant
- b) the angular velocity is zero
- c) the angular acceleration is zero
- d) the radial acceleration is zero

ANSWER: C – THE ANGULAR ACCELERATION IS ZERO

Bonus

8. PHYS; Multiple Choice: In what wavelength region is the transmission of infrared radiation, or radiant heat, through the Earth's atmosphere least affected by absorption by air molecules?

- a) 4 to 8 micrometers
- b) 8 to 12 micrometers
- c) 12 to 16 micrometers
- d) same at all wavelengths

ANSWER: B – 8 TO 12 MICROMETERS

Toss-Up

9. ERSC; Multiple Choice: The chemical element responsible for most red-colored earth and rock is:
- a) copper
 - b) gold
 - c) aluminum
 - d) iron

ANSWER: D – IRON

Bonus

9. ERSC; Short Answer: Scientists from all over the world come to Las Vegas to study a major fault at the Red Rock Area to the west of town. What is the name of this fault?

ANSWER: KEYSTONE OVERTHRUST (OR KEYSTONE THRUST)

Toss-Up

10. CHEM; Multiple Choice: Of the following elements, which has the largest atomic radius?
- a) Barium
 - b) Fluorine
 - c) Carbon
 - d) Beryllium

ANSWER: A – BARIUM

Bonus

10. CHEM; Short Answer: What bond angle is associated with sp hybrid orbitals?

ANSWER: 180 DEGREES

Toss-Up

11. BIOL; Multiple Choice: Mammalian cells that export large quantities of proteins for use by other cells in the body usually have very large:

- a) golgi complexes
- b) ribosomes
- c) smooth endoplasmic reticulum
- d) nuclei

ANSWER: A – GOLGI COMPLEXES

Bonus

11. BIOL; Multiple Choice: In what part of the chloroplast are the photosynthetic pigments found?

- a) stroma
- b) outer membrane
- c) crista
- d) thylakoid membrane

ANSWER: D – THYLAKOID MEMBRANE

Toss-Up

12. CHEM; Short Answer: Which order process is radioactive decay?

ANSWER: FIRST-ORDER PROCESS

Bonus

12. CHEM; Short Answer: In commercial vulcanization of rubber, what element is added to introduce crosslinking?

ANSWER: SULFUR

Toss-Up

13. MATH; Multiple Choice: The log to the base 10 of 1,000,529 is approximately:

- a) 10
- b) 7
- c) 6
- d) 3

ANSWER: C – 6

Bonus

13. MATH; Multiple Choice: What type of conic section does the equation $x^2 + 9x + y^2 - 163 = 0$ represent?

- a) hyperbola
- b) circle
- c) parabola
- d) line

ANSWER: B – CIRCLE

Toss-Up

14. GENR; Short Answer: Who built the Spruce Goose, a large, wooden flying boat?

ANSWER: HOWARD HUGES

Bonus

14. GENR; Short Answer: what architect's story was told in Wizard of the Dome?

ANSWER: BUCKMINSTER FULLER

Toss-Up

15. BIOL; Multiple Choice: Some animal hormones work by binding to a target cell receptor on the plasma membrane and releasing a second messenger within the target cell. This second messenger is:

- a) cAMP
- b) ATP
- c) GTP
- d) CTP

ANSWER: A – cAMP (CYCLIC AMP)

Bonus

15. BIOL; Multiple Choice: Some animal hormones enter directly into the target cell. These types of hormones are generally classified as:

- a) peptide hormones
- b) primary messenger hormones
- c) steroid hormones
- d) cholesterol hormones

ANSWER:

Toss-Up

16. ASTR; Short Answer: Why are impact craters readily visible on the moon, but not on the earth, when both have experienced approximately the same frequency of collisions with impacting objects such as meteors, etc.?

ANSWER: THE MOON HAS NO ATMOSPHERE (TO ERODE AWAY THE CRATERS)

Bonus

16. ASTR; Short Answer: Other than bodies of water, what is the only man-made object visible on earth from space with the naked eye

ANSWER: THE GREAT WALL OF CHINA

Toss-Up

17. PHYS; Multiple Choice: A wheel rotates with a constant, nonzero angular acceleration. Which of the following quantities remains constant in magnitude?

- a) tangential velocity
- b) tangential acceleration
- c) radial acceleration
- d) angular velocity

ANSWER: B – TANGENTIAL ACCELERATION

Bonus

17. PHYS; Short Answer: Whose name is associated with belts of charged particles surrounding the earth?

ANSWER: (JAMES) VAN ALLEN

Toss-Up

18. CHEM; Short Answer: What element is substituted for hydrogen when ethylene is polymerized to produce Teflon?

ANSWER: FLUORINE

Bonus

18. CHEM; Short Answer: Priestley called the gas he prepared “perfect air”. Later who named this gas “oxygen”?

ANSWER: LAVOISIER

Toss-Up

19. ERSC; Multiple Choice: Faulting which results in older rocks overlaying younger rocks is called:

- a) normal faulting
- b) dip slip faulting
- c) strike slip faulting
- d) thrust faulting

ANSWER: D – THRUST FAULTING

Bonus

19. ERSC; Multiple Choice: What is the common name for an alkalic porphyritic peridotite?

- a) kimberlite
- b) monzonite
- c) montmorillonite
- d) christobalite

ANSWER: A - KIMBERLITE

Toss-Up

20. GENR; Short Answer: Who fle a N-X-211 Ryan Monoplane into history?

ANSWER: CHARLES LINDBERGH

Bonus

20. GENR; Short Answer: What does the abbreviation cwt. stand for?

ANSWER: HUNDREDWEIGHT

Toss-Up

21. BIOL; Multiple Choice: The Krebs Cycle (tricarboxylic acid cycle) is a series reactions which takes place in the mitochondrion. In what part of the mitochondrion are the enzymes responsible for the Krebs cycle located?

- a) crista
- b) matrix
- c) stroma
- d) inner membrane

ANSWER: B – MATRIX

Bonus

21. BIOL; Short Answer: The protein complex (plate) found on the centromere of chromosomes is where the spindle fiber attaches during mitosis or meiosis. What is this protein structure called?

ANSWER: THE KINETOCHORE

Toss-Up

22. MATH; Multiple Choice: In the ellipse with equation $(x^2/a^2) + (y^2/b^2) = 1$, what is the length of the vertical axis?

- a) a^2
- b) b^2
- c) $2a$
- d) $2b$

ANSWER: D – 2B

Bonus

22. MATH; Short Answer: If the second derivative of the equation of a curve is equal to the negative of the equation of that same curve, what is the form of the curve?

ANSWER: A SINUSOID (ACCEPT SINE WAVE OR COSINE WAVE)

Toss-Up

23. PHYS; Multiple Choice: In December 1993, the Princeton Plasma Physics Laboratory announced that they had achieved a record power level for a fusion experiment. What was this new level?

- a) 6000 watts
- b) 600,000 watts
- c) 6,000,000 watts
- d) 60,000,000 watts

ANSWER: C – 6,000,000 WATTS

Bonus

23. PHYS; Short Answer: The Princeton fusion machine is called TFTR. What does this stand for?

ANSWER: TOKAMAK FUSION TEST REACTOR

Toss-Up

24. CHEM; Short Answer: What compound accounts for the unpleasant odor in decayed eggs?

ANSWER: HYDROGEN SULFIDE

Bonus

24. CHEM; Short Answer: Name any three of the four elements that are ferromagnetic at 0 degrees Celcius.

ANSWER: IRON, COBALT, NICKEL, AND GADOLINIUM

Toss-Up

25. PHYS; Multiple Choice, in an AC (alternating current) inductive electrical circuit, which of the following occurs?

- a) current leads voltage
- b) voltage leads current
- c) voltage and current are in phase
- d) voltage lags current

ANSWER: B – VOLTAGE LEADS CURRENT

Bonus

25. PHYS; Multiple Choice: When a body is floated in a liquid, which of the following is used in determining the weight?

- a) the force per unit area exerted on it
- b) the volume of the liquid displaced
- c) the depth at which point the weights of the object and displaced liquid are equal
- d) the weight of the liquid displaced

ANSWER: D – THE WEIGHT OF THE LIQUID DISPLACED
